Using Arduino to Create an Online Reactor Reactivity Meter

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TOOLS:

- Picoammeter or Current Amplifier or Electrometer or RateMeter (1)

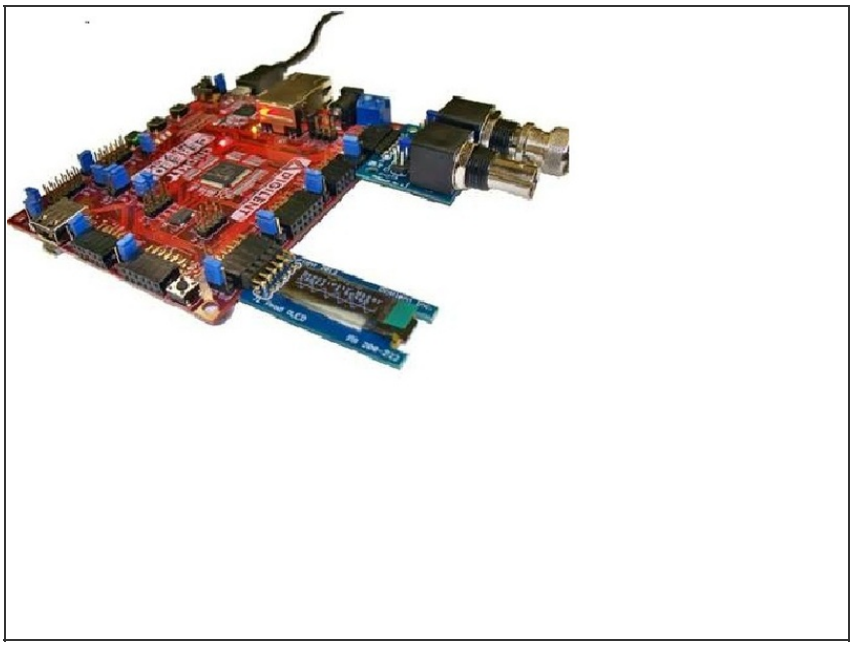
PARTS:

- Cerebot MX7ck board, OLED Screen and USB cable to computer using UART (1)

SUMMARY

Inverse-kinetics is an equation that will calculate the reactivity value for the reactor (in terms of cents). The meter should start when the reactor is critical.

Step 1 — Using Arduino to Create an Online Reactor Reactivity Meter



- To change the signal from a current chamber use a picoammeter or current amplifier. There is usually an analog voltage output for the range. The signal is usually inverted. Invert the signal using an op-amp.
- For a pulse detector us a rate meter to obtain an output voltage. Some resistors may be required to change the 0-10V output to 0-3.3V.
- Program the micro-controller to sample the voltage. Filtering the data is recommended
- Use the inverse-kinetics equation to determine reactivity.
- Filtering the reactivity output is also recommended.
- For my project I sent the data out to an OLED screen for display and I also sent it to LabView where it can be stored.

The code is attached in the documents. An additional header file was used to change a float to string. I got the header file from the Arduino playground. I'm sure there is a better way to do it but I couldn't figure it out because I'm new to C++. I also attached a picture of the labview program. The output from the micro-controller to the computer uses a comma to separate the reactivity value and timestamp.

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